B6 Photographic Analyses Using Skin Detail of the Hand: A Methodology and Statistical Evaluation

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After attending this presentation, attendees will understand a method for examining micro-level skin detail of the dorsal surface of the hand in photographic comparisons. Such comparisons have been conducted worldwide by experts in image analysis and human variation, using skin features to demonstrate unique aspects of unknown individuals.

This presentation will impact the forensic science community by demonstrating a method which can be easily employed to assess the distribution and frequency of commonly found skin features on the dorsal surface of the hand.

Lesions, scars, marks, tattoos, and other imprints on the skin can aid in the identification of unknown individuals and have been employed by law enforcement agencies for suspect and victim identification. The importance of hand analysis has arisen in recent forensic image comparison casework, including sexual assault and child exploitation cases, where images have been submitted in which the individual's face was not present in the image.

This research utilizes a database of 128 hands collected from employees of the U.S. Army Criminal Investigation Laboratory to examine the frequency and distribution of micro-level skin detail on the dorsa of the hand. To assess the location of features, the hand was segmented into fourteen regions using readily discernable anatomical landmarks. Each hand was assessed for the number of features found in each region. Pigmented lesions were observed in 14/14 regions, and scars or injuries were observed in 13/14 of the regions. Overall, 2,618 pigmented lesions and ninety-two scars or injuries were documented.

Descriptive statistics (range, mean, and variance) were calculated to compare each of the regions to one another. Additional statistical techniques were employed to determine which regions of the hand demonstrated significant difference in the distribution of features. When the location of pigmented lesions was considered, Region Thirteen expressed the most pigmented lesions per hand, and Region One demonstrated the least pigmented lesions per hand. When evaluating the location of scars and injuries, Region Eleven exhibited the most scars/injuries per hand, and Region One showed the least scars/injuries per hand. The quantity of lesions present and how they were distributed across regions provided information on how the hands could be differentiated from one another.

Through the assessment of skin detail in this study, an examiner has another tool that can be employed when performing photographic comparisons and when explaining findings in a courtroom. With the increased demand for photographic comparisons of skin and the expanded availability of digital cameras, the current study presents a set of data and calls for the implementation of further research.

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Photographic Comparisons, Image Analysis, Forensic Identification

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